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AUTHOR Sauer, Kenneth R.; And Others
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ABSTRACT

The value of a statewide analytical perspective to the institutional program review process is discussed. This perspective can also assist in answering the questions of how declining resources can be distributed within and among institutions. The analytical approach was developed in order to provide background information that can be used both by institutions and the staff of the Illinois Board of Higher Education (IBHE) in identifying program areas that should receive special attention in the program review process. In the application of the procedure, emphasis was placed on fields of study in which there may be too many programs of the same type being offered by public universities. Two indices providing background information for IBHE and university staff for program review purposes are: the change in unit costs (cost per credit hour) between 1976 and 1981 and the change in resources per university program over the same period. Information is collected on the nature of campus activities (i.e., instruction, public service, or research), and costs and credit hours at the disciplinary level based on degree program enrollments. Data are provided on the indices for upper division majors and graduate majors. (SW)

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REALLOCATION AND PROGRAM REVIEW FROM A STATE-LEVEL PERSPECTIVE

Kenneth R. Sauer
Associate Director for Academic and Health Affairs

Stephen M. Bragg
Assistant Director for Fiscal Affairs

Robert A. Wallhaus
Deputy Director for Academic and Health Affairs

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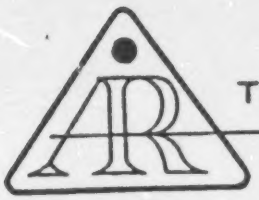

THE ASSOCIATION FOR INSTITUTIONAL RESEARCH

This paper was presented at the Twenty-Third Annual Forum of the Association for Institutional Research held at the Sheraton Centre in Toronto, Ontario, May 23-26, 1983. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum papers.

D. R. Coleman, Chairman
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To maintain their vitality universities must be able to launch new instructional programs and to meet staffing and equipment needs of high demand degree programs. Individual states, trying to maintain the vitality of entire postsecondary education systems, must have the same ability. Recent reductions in real if not actual state appropriations to higher education have challenged many states and their universities to find alternative strategies to maintain quality programs and responsiveness to educational needs. Reallocation of resources from existing programs to support new or expanding programs is now widely discussed as being an appropriate strategy. (Mortimer and Tierney, 1979; Mingle, 1981).

The key question concerning reallocation in the 1980s has been summarized well by Craven (1980): "How should declining resources be distributed to the instructional units within an institution - should all units share proportionally in cutbacks or should resource reductions be made selectively and, if so, on what basis?" This same question may be rephrased from a state-level perspective: How should declining resources be distributed to the instructional units within and among institutions - "should all units and institutions share proportionally in cutbacks...?"

Program review is an important mechanism for enhancing the quality of instruction at an institution. Beneficial outcomes that might result from program review include reorienting a program to attract

more students; suggesting directions for faculty development; reducing course duplication by carefully aligning the curricula of different programs; strengthening a program by consolidating options; and eliminating weak, low priority programs. Several of these results can also provide a source of funds from which reallocations to new and expanding programs can occur.

Much has been written on program review in individual institutions (Anderson and Ball, 1978; Craven, 1981; and Dressel, 1976 provide good summaries of the literature) and increasing attention is being given to a variety of issues regarding state-level responsibilities in program review (Barak and Berdahl, 1978; Barak, 1981; Chance, 1980; Floyd, 1983; Green, 1981; Groves, 1979; Skubal, 1979; and Wallhaus, 1982). However, relatively little has been said about analytical approaches that support program review from a state-level perspective. This paper describes one means by which a statewide analytical perspective can inform the program review process within institutions and can assist in answering the questions of how declining resources can be distributed within and among institutions.

Program Review in Illinois

The Illinois Board of Higher Education (IBHE) provides guidelines describing a minimum set of issues that should be addressed in the course of the review process (IBHE, 1982a), although the responsibility for actually undertaking program reviews rests with each public university. Each public university annually submits to the IBHE the results of reviewing approximately one-fifth of the university's programs. The IBHE staff then examines the results of each program review in the

context of data routinely supplied by the public universities each year, supplementary data requested of the universities, and discussions with university representatives.

In most cases, the programs are found by the IBHE staff to be educationally and economically justified. However, some reviews result in serious weaknesses being identified in programs. The IBHE highlights those instances in which universities have responded to these weaknesses either by eliminating or significantly restructuring programs. In other cases, the IBHE recommends to the university governing board that programs are no longer educationally and economically justified and should therefore be eliminated.

The analytical approach described below was developed in order to provide background information that can be used both by institutions and IBHE staff in identifying program areas that should receive special attention in the program review process. In the application of the procedure described in this paper, emphasis was placed on those fields of study in which -- from a statewide perspective and in light of declining resources -- there may be too many programs of the same type being offered by public universities.

Method

Two indices were developed as part of the background information the available to university and IBHE staff for program review purposes -- the change in unit costs (cost per credit hour) between FY1976 and FY1981 and the change in resources per university program over the

same period. The former is a rough measure of efficiency while the latter is a rough measure of quality insofar as fewer dollars available to a program would generally translate into fewer faculty covering fewer specializations, all other factors being equal.

Both indices were developed using measures from the Illinois Board of Higher Education's annual University Cost Study (IBHE, 1982b). To understand these indices it is necessary to understand their components and how they are measured in the Cost Study.

University Cost Study. The University Cost Study assigns the various activities occurring on each public university campus to one or more of three primary functions — instruction, public service and organized research. Only the activities assigned to the instruction function were examined in this analysis.

The instruction function is further broken down into four instructional levels: lower division, upper division, masters and first professional, and doctoral. Once all activities have been assigned to one or more of these levels, the direct salaries associated with those activities are also assigned to the same level. This process occurs for each discipline offering instruction at a given university. The NCES Classification of Instructional Programs in Higher Education is used to provide discipline categories. Credit hour production is also collected for each level of instruction within each discipline.

Once direct salary costs and credit hours have been allocated, the accumulated overhead costs for the university are distributed among instructional levels and disciplines based on their proportion of direct costs or student credit hours, depending on the category of overhead. In this way, all State appropriated funds (which in Illinois includes tuition and fees) are accounted for in the Cost Study. Funds from external gifts, grants, or contracts are not included in the University Cost Study.

Using these data, then, it is possible to calculate unit costs for each of the four instructional levels within each discipline. Unfortunately for this research, public universities have only been required to submit costs and credit hours to IBHE at the first two-digit level of the HEGIS codes. While some departments such as computer science or psychology are assigned a unique two-digit code, other departments such as economics and history, or physics and chemistry, are aggregated in broader groups such as social sciences or physical sciences, respectively. For the purposes of this research, such an aggregation would mask too much of the enrollment and resource dynamics.

Program/Major Cost Study. The IBHE also collects information on costs and credit hours at a more detailed disciplinary level based on degree program enrollments. Every public university in Illinois annually builds an induced workload matrix cross-tabulating credit hours taken by various program majors in various disciplines. The

degree programs are coded at the four-digit HEGIS code level. When the discipline unit costs are post-multiplied by the induced workload matrix, program costs are obtained. These costs, in turn, may be divided by the credit hours generated in the major to yield a program unit cost at the four-digit HEGIS code level. It is these costs and credit hours that were used in this study.

Units of Analysis. Since a primary purpose of this analysis was to investigate the possibility of unnecessary duplicative degree programs throughout the State, a lower limit on the number of programs in any field of study was set to exclude unique or near unique programs. At the baccalaureate level fields of study with five or fewer programs throughout the State were excluded from the analysis. At the masters and doctoral level, the cut-offs were four or less and one, respectively. This decision rule resulted in 376 baccalaureate programs in 48 fields of study being included in the analysis. Also included were 265 masters or first professional programs in 37 fields of study and 78 doctoral programs in 27 fields of study. For each field of study included in the analysis, the data for the individual programs in that HEGIS code were aggregated and the two indices (unit cost and cost per program) were calculated on the basis of the aggregated data.

Results

Tables 1, 2, and 3 show shifts in student demand that have occurred in public universities statewide between fiscal year 1976 and 1981 at the baccalureate, masters and doctoral level. They also show the number of programs in each year.

TABLE 1
CHANGES IN CREDIT HOURS BETWEEN 1976 AND 1981

UPPER DIVISION MAJORS

PROGRAM	1976 CREDIT HOURS	1981 CREDIT HOURS	PERCENT CHANGE	1976 PROGRAMS	1981 PROGRAMS
Biology	94,846	66,479	29.8-	11	11
Business and Commerce	88,349	94,027	6.4	7	7
Accounting	108,842	120,037	10.3	8	9
Banking and Finance	34,527	49,777	44.2	6	6
Business Management and Admin.	79,298	100,515	26.8	9	9
Marketing	37,653	51,867	37.7	6	5
Communications	14,957	20,911	39.8	4	6
Computer and Info Sci.	12,264	41,154	235.6	4	7
Elementary Education	110,625	74,922	32.2-	10	10
Special Education	81,471	57,737	29.0-	7	7
Physical Education	69,176	48,094	30.4-	10	10
Health Education	7,832	5,856	25.1-	5	5
Bus, Commer, and Distrib. Educ.	17,478	11,144	36.1-	7	9
Indus. Arts, Voc. Tech. Educ.	15,097	10,468	30.6-	6	7
Engineering Technologies	24,219	37,858	56.3	6	6
Art	47,467	33,030	30.3-	10	9
Music	17,924	11,130	37.8-	7	7
Dramatic Arts	10,325	9,990	3.2-	6	8
French	8,876	4,737	46.5-	8	8
German	4,250	2,643	37.7-	7	7
Spanish	13,709	7,542	44.9-	9	9
Russian	1,232	530	56.9-	7	4
Nursing	24,763	27,070	9.3	8	7
Speech Pathology and Audiology	14,728	12,948	12.0-	7	8
Medical Lab Technologies	9,244	8,871	3.9-	8	8
Home Economics	34,046	27,317	19.7-	7	4
English	49,526	28,448	42.5-	10	11
Speech	27,755	30,654	10.4	8	8
Philosophy	6,867	2,962	56.8-	9	9
Mathematics	36,869	29,419	20.1-	10	10
Physical Sciences	975	291	70.1-	5	3
Physics	6,536	6,603	1.0	9	9
Chemistry	22,827	23,414	2.6	10	10
Geology	8,583	12,131	41.3	7	7
Earth Sciences	2,307	2,215	3.9-	5	4
Psychology	103,355	64,877	37.1-	12	12
Parks and Recreation Management	20,391	22,118	8.5	5	6
Social Work and Helping Serv.	20,512	20,599	.4	8	8
Law Enforcement and Corrections	22,811	26,919	18.0	3	5
Social Sciences	10,299	3,783	63.2-	8	7
Anthropology	9,984	5,493	44.9-	7	8
Economics	20,049	28,196	40.6	9	10
History	44,158	21,396	51.5-	11	11
Geography	13,072	8,401	35.6-	10	10
Political Science	51,507	45,490	11.6-	10	11
Sociology	41,011	20,243	50.6-	10	10
General Lib. Arts and Sciences	69,502	17,876	74.2-	7	7
Totals	1,585,345	1,371,367	13.4-	368	376

Source: FY'76 and FY'81 Program Major Cost Studies for Public Universities.
Fields of study in which 6 or more programs were offered statewide in either 1976 or 1981 are included in this table. Also included were Earth Sciences, Physical Sciences and Health Education in which 3 programs were offered in one or both of these years.

TABLE 2
CHANGES IN CREDIT HOURS BETWEEN 1976 AND 1981

GRADUATE I MAJORS

PROGRAM	1976 CREDIT HOURS	1981 CREDIT HOURS	PERCENT CHANGE	1976 PROGRAMS	1981 PROGRAMS
Biology	12,211	9,856	19.2-	10	11
Business and Commerce	21,566	25,505	18.3	5	7
Accounting	4,281	4,008	6.3-	5	5
Business and Management and Admin.	17,822	23,429	31.5	5	5
Communications	9,927	6,001	39.5-	6	5
Computer and Info. Sci.	4,390	8,500	93.6	3	6
Elementary Educaton	16,234	18,859	16.2	9	9
Secondary Education	7,656	5,937	22.4-	4	6
Special Educati n	19,913	22,555	13.3	7	9
Counseling and Guidance	18,001	16,638	7.5-	6	8
Educational Administration	12,802	17,497	36.7	6	11
Reading Education	8,744	8,203	6.1-	5	5
Physical Education	8,022	9,358	16.7	9	9
Bus, Commer, and Distrib. Educ.	2,500	2,405	3.7-	6	8
Indus. Arts, Voc. Tech. Educ.	4,723	4,078	13.6-	6	5
Art	9,184	7,360	19.8-	9	7
Music	7,072	6,773	4.1-	5	7
Dramatic Arts	2,885	3,969	37.6	4	6
Speech Pathology and Audiolog	8,113	7,955	1.9-	5	6
Home Economics	4,304	1,128	73.7-	6	3
English	5,861	4,090	30.1-	8	7
Literature	5,347	3,724	32.8-	5	5
Linguistics	2,003	1,899	5.1-	4	5
Speech	5,278	5,607	6.2	7	8
Philosophy	1,611	1,293	19.6-	5	5
Mathematics	8,261	5,758	30.2-	10	10
Physics	3,825	3,341	12.6-	7	7
Chemistry	4,951	5,497	11.0	8	9
Geology	2,407	2,706	12.4	5	5
Psychology	13,100	11,331	13.4-	11	9
Public Administration	3,256	6,269	92.5	3	6
Anthropology	2,696	1,924	28.5-	5	5
Economics	4,850	3,879	19.9-	9	8
History	7,726	6,883	10.8-	11	11
Geography	3,817	3,781	.9-	9	9
Political Science	5,595	4,528	19.0-	10	10
Sociology	3,939	2,231	42.0-	10	8
Totals	285,073	284,805	.0	248	265

Source: FY'76 and FY'81 Program Major Cost Studies for Public Universities.
Only fields of study in which 5 or more programs were offered statewide in either 1976 or 1981 are included in this table. In a few cases data for closely related programs have been combined.

TABLE 3
CHANGES IN CREDIT HOURS BETWEEN 1976 AND 1981

GRADUATE II MAJORS

PROGRAM	1976 CREDIT HOURS	1981 CREDIT HOURS	PERCENT CHANGE	1976 PROGRAMS	1981 PROGRAMS
Biology	3,025	4,646	53.6	3	3
Botany	787	1,155	46.8	2	2
Zoology	1,607	519	67.6-	2	2
Physiology	1,292	1,346	4.2	2	2
Microbiology	1,522	2,099	37.9	2	2
Education	8,113	9,552	17.7	2	2
Elementary Education	3,153	2,363	25.0-	2	2
Secondary Education	4,292	2,455	42.7-	2	2
Special Education	1,185	1,393	17.6	1	4
Educational Psychology	4,255	3,496	17.7-	2	2
Educational Administration	8,247	4,518	45.1-	3	3
Curriculum and Instruction	1,123	2,017	70.6	1	3
Speech Pathology and Audiolog	1,135	987	12.9-	2	2
English	4,671	2,883	38.2-	4	5
Speech	2,253	1,551	31.1-	2	3
Philosophy	1,834	1,301	29.0-	3	3
Mathematics	5,014	4,197	16.2-	4	4
Physics	8,312	8,475	2.0	2	2
Chemistry	9,926	11,036	11.4	4	4
Psychology	7,513	7,191	4.2-	4	4
Social Work	6,889	6,524	5.2-	2	2
Anthropology	2,018	2,030	.6	3	2
Economics	3,352	2,642	21.1-	4	5
History	4,113	2,714	33.9-	5	4
Geography	1,126	872	22.5-	2	2
Political Science	2,708	1,695	37.3-	4	4
Sociology	2,431	2,004	17.5-	3	3
Totals	102,076	91,681	10.1-	74	78

Source: FY'76 and FY'81 Program Major Cost Studies for Public Universities.
Only fields of study in which 2 or more programs were offered statewide in either 1976 or 1981 are included in this table. In a few cases data for closely related programs have been combined.

Some disciplines have been confronted with dramatic enrollment pressures: computer science at the upper division (+236%) and masters (+94%), public administration at the masters level (+93%) and biology at the doctoral level (+54%). Other disciplines have experienced dramatic decreases in student demand: foreign languages at the upper division (-51%), home economics at the masters level (-74%) and philosophy at the baccalaureate level (-57%). Tables 1, 2 and 3 show that many fields of study statewide have seen increases or decreases in student demand of more than 40 percent over the last five years; and virtually every field of study at every level exhibits a plus or minus ten percent change in student major credit hours over this relatively short period of time.

When significant losses of student majors occur, as reflected in negative percent changes in student credit hours, unit costs (i.e., dollars per student credit hour) increase unless the university is able to accomplish off-setting reallocations of resources. However, such reallocations are difficult to achieve over short time spans. Universities do not have unlimited flexibility to reassign resources. Further, there are limits on the extent to which resources can be withdrawn from a field of study before impairing educational quality.

Tables 4, 5 and 6 present the costs per credit hour and costs per program in FY1976 and FY1981 for the various fields of study. In all cases FY1976 costs have been adjusted for inflation.

TABLE 4

CHANGES IN COSTS PER CREDIT HOUR AND COSTS PER PROGRAM 1976 TO 1981
UPPER DIVISION MAJORS

MAJOR	INFLATED 1976 COSTS PER CREDIT HOUR	1981 COSTS PER CREDIT HOUR	PERCENT CHANGE	INFLATED 1976 COSTS PER PROGRAM	1981 COSTS PER PROGRAM	PERCENT CHANGE	CAT. CODE
Biology	121.99	122.89	.7	1,051,813.70	743,702.18	29.3-	3
Business and Commerce	77.67	84.58	8.9	980,295.73	1,136,051.00	15.9	1
Accounting	77.29	81.48	5.4	1,051,491.15	1,086,720.11	3.4	1
Banking and Finance	75.23	77.41	1.5	436,947.91	642,217.00	47.0	1
Business Management and Admin.	85.87	84.42	1.6-	756,558.90	942,880.89	24.6	2
Marketing	77.48	80.98	4.5	486,229.58	839,988.00	72.8	1
Communications	103.84	108.39	4.4	388,272.87	377,762.00	2.6-	3
Computer and Info Sci.	100.14	92.37	7.7-	307,039.00	543,044.57	76.9	2
Elementary Education	109.11	107.21	1.7-	1,207,069.70	803,244.40	33.4-	4
Special Education	98.28	109.46	11.4	1,143,874.28	902,831.14	21.0-	3
Physical Education	106.58	112.87	5.9	737,507.31	542,824.60	26.3-	3
Health Education	94.45	96.91	2.6	147,948.63	113,503.60	23.2-	3
Bus, Commer, and Distrib. Educ.	98.76	111.64	13.0	246,583.30	138,239.78	43.8-	3
Indus. Arts, Voc. Tech. Educ.	113.57	120.95	6.5	285,757.29	180,871.57	36.6-	3
Engineering Technologies	101.53	106.27	4.7	409,838.46	670,515.67	63.6	1
Art	115.83	126.08	8.8	549,824.02	462,721.56	15.8-	3
Music (Performance)	127.19	156.66	23.2	336,578.77	295,077.29	12.2-	3
Music	137.51	157.69	14.7	352,105.91	250,733.29	28.7-	3
Dramatic Arts	114.11	128.10	12.3	196,366.58	159,966.25	18.4-	3
French	112.93	101.94	9.6-	125,292.66	60,360.50	51.7-	4
German	110.18	110.83	.6	66,892.32	41,844.43	37.4-	3
Spanish	105.39	106.87	1.4	160,534.35	89,560.44	44.1-	3
Russian	129.12	137.45	6.5	22,725.97	18,212.75	19.8-	3
Nursing	158.20	186.53	17.9	489,679.97	721,342.43	47.3	1
Speech Pathology and Audiology	98.10	111.49	13.6	206,412.91	180,450.88	12.5-	3
Medical Lab Technologies	129.18	135.01	4.5	149,262.71	149,714.00	.3	1
Home Economics	92.05	92.48	.5	447,687.67	631,552.00	41.1	1
English	103.13	109.35	6.0	510,780.57	282,800.18	44.5-	3
Speech	94.27	91.98	2.3-	327,052.26	352,455.13	7.8	2
Philosophy	100.14	99.60	.4-	76,403.99	32,779.78	57.0-	4
Mathematics	102.76	100.97	1.7-	378,851.56	297,042.00	21.5-	4
Physical Sciences	161.07	199.31	23.7	31,409.28	19,333.00	38.4-	3
Physics	130.69	119.53	8.4-	94,908.60	87,692.11	7.5-	4
Chemistry	135.92	138.43	1.8	310,267.45	324,126.20	4.5	1
Geology	118.82	114.00	4.0-	145,688.16	197,559.14	35.6	2
Earth Sciences	101.03	136.09	34.7	46,615.03	75,361.00	61.7	1
Psychology	90.65	100.25	10.6	780,752.46	541,974.00	30.5-	3
Parks and Recreation Management	92.61	102.55	10.7	377,679.18	378,051.00	.1	1
Social Work and Helping Serv.	97.79	121.47	24.2	250,722.95	312,781.00	24.8	1
Law Enforcement and Corrections	72.19	91.87	27.3	548,943.10	494,612.60	9.8-	3
Social Sciences	90.68	110.26	21.6	116,735.00	59,585.43	48.9-	3
Anthropology	105.64	129.14	22.2	150,676.62	88,668.00	41.1-	3
Economics	89.25	83.69	6.1-	198,814.25	235,980.40	18.7	2
History	103.87	110.79	6.7	416,990.80	215,497.00	48.2-	3
Geography	108.31	114.20	5.4	141,581.17	95,936.50	32.1-	3
Political Science	94.83	97.36	2.7	488,457.26	402,640.45	17.5-	3
Sociology	91.72	97.06	5.8	376,163.62	196,469.80	47.7-	3
General Lib Arts and Sciences	109.40	114.85	5.0	1,086,187.77	293,293.57	72.9-	3
Statewide Average	99.76	102.46	2.7	429,787.38	373,688.48	13.1-	

TABLE 5
CHANGES IN COSTS PER CREDIT HOUR AND COSTS PER PROGRAM 1976 TO 1981
GRADUATE I MAJORS

MAJOR	INFLATED 1976 COSTS PER CREDIT HOUR	1981 COSTS PER CREDIT HOUR	PERCENT CHANGE	INFLATED 1976 COSTS PER PROGRAM	1981 COSTS PER PROGRAM	PERCENT CHANGE	CAT. CODE
Biology	268.76	313.06	16.5	328,183.58	280,499.64	14.4-	3
Business and Commerce	131.92	136.85	3.7	568,982.35	498,632.71	12.3-	3
Accounting	147.56	175.22	18.7	126,336.74	140,460.00	11.2	1
Business Management and Admin.	136.37	150.89	10.6	486,089.60	707,029.80	45.5	1
Communications	137.49	180.09	31.0	227,476.45	216,143.20	4.9-	3
Computer and Info Sci.	209.15	178.24	14.7-	306,055.98	252,500.68	17.4-	4
Elementary Education	130.31	132.02	1.3	235,057.92	276,640.89	17.7	1
Secondary Education	141.97	158.47	11.6	271,737.87	156,809.00	42.2-	3
Special Education	140.29	133.80	4.5-	399,087.42	335,313.78	15.9-	4
Counseling and Guidance	133.41	165.64	24.2	400,249.13	344,491.38	13.8-	3
Educational Administration	135.72	157.51	16.1	289,577.92	250,546.45	13.4-	3
Reading Education	146.75	140.16	4.4-	256,644.81	229,945.00	10.3-	4
Physical Education	162.75	179.67	10.4	145,060.30	186,814.56	28.8	1
Bus, Commer, and Distrib. Educ.	171.96	168.95	1.7-	71,649.22	50,791.00	29.0-	4
Indus. Arts, Voc. Tech. Educ.	128.45	166.15	29.3	101,110.92	135,509.40	34.0	1
Art	184.26	237.23	28.7	188,027.15	249,426.29	32.7	1
Music	237.63	261.69	10.1	336,110.88	253,207.43	24.6-	3
Dramatic Arts	289.51	234.23	19.0-	208,806.03	154,345.50	25.7-	4
Speech Pathology and Audiology	181.14	213.53	17.9	293,919.13	283,098.67	3.6-	3
English	211.87	229.12	8.1	155,222.62	133,870.57	13.7-	3
Literature	166.63	238.02	42.8	184,858.96	177,279.80	4.0-	3
Linguistics	180.16	168.57	6.3-	90,213.49	64,022.60	28.9-	4
Speech	207.28	180.94	12.6-	156,291.11	126,817.63	18.8-	4
Philosophy	275.08	257.22	6.4-	88,631.14	66,516.20	24.9-	4
Mathematics	175.88	196.61	11.8	145,292.72	113,210.70	22.0-	3
Physics	254.09	246.17	3.0-	138,843.74	117,492.86	15.3-	4
Chemistry	275.38	286.33	4.0	170,423.39	174,886.78	2.6	1
Geology	371.21	366.19	1.3-	178,701.68	198,181.00	10.9	2
Psychology	187.11	218.94	17.0	222,834.94	275,644.44	23.7	1
Public Administration	161.05	177.36	10.1	174,796.78	185,312.83	6.0	1
Anthropology	250.98	273.76	9.1	135,301.38	105,344.00	22.1-	3
Economics	211.99	195.63	7.6-	214,240.76	94,854.50	16.9-	4
History	217.05	241.99	11.5	152,419.91	151,419.91	.6-	3
Geography	297.73	283.40	36.4	88,101.78	119,057.78	35.1	1
Political Science	198.18	186.49	5.8-	110,881.84	84,442.10	23.8-	4
Sociology	217.99	233.75	7.2	85,866.89	66,646.88	22.3-	3
Statewide Average	173.96	184.72	6.2	199,962.58	198,522.71	0.7	3

TABLE 6

CHANGES IN COSTS PER CREDIT HOUR AND COSTS PER PROGRAM 1976 TO 1981
GRADUATE II MAJORS

MAJOR	INFLATED 1976 COSTS PER CREDIT HOUR	1981 COSTS PER CREDIT HOUR	PERCENT CHANGE	INFLATED 1976 COSTS PER PROGRAM	1981 COSTS PER PROGRAM	PERCENT CHANGE	CAT. CODE
Biology	471.86	452.15	4.1-	475,790.57	700,230.67	47.2	2
Botany	484.25	392.92	18.8-	190,553.08	226,911.50	19.1	2
Zoology	433.57	399.49	7.8-	348,372.16	103,667.50	70.2-	4
Physiology	350.03	440.77	25.9	226,122.46	296,640.00	31.2	1
Microbiology	312.19	314.90	.9	237,574.75	330,489.50	39.1	1
Education	289.03	273.55	5.3-	1,172,462.81	1,306,466.50	11.4	2
Elementary Education	207.02	225.60	9.0	326,370.91	266,551.00	18.2-	3
Secondary Education	146.58	215.98	47.3	314,557.00	265,118.00	15.6-	3
Special Education	190.84	274.96	44.1	226,140.91	95,754.25	57.6-	3
Educational Psychology	171.70	216.38	26.0	365,302.62	378,236.00	3.5	1
Educational Administration	208.83	285.62	36.8	574,084.30	430,144.00	25.0-	3
Curriculum and Instruction	317.25	328.03	3.4	356,276.88	220,546.00	38.0-	3
Speech Pathology and Audiology	307.46	317.54	3.3	174,481.65	156,705.00	10.1-	3
English	303.24	304.75	.5	354,103.10	175,720.20	50.3-	3
Speech	307.01	291.32	5.0-	345,841.56	150,610.67	56.4-	4
Philosophy	363.95	323.74	11.0-	222,495.68	140,397.00	36.8-	4
Mathematics	300.02	277.73	7.3-	376,074.10	291,405.50	22.4-	4
Physics	392.57	404.15	2.9	1,631,534.24	1,712,575.00	5.0	1
Chemistry	243.90	235.93	3.2-	605,238.60	652,110.75	7.7	2
Psychology	331.58	352.08	6.2	622,787.87	632,950.75	1.6	1
Social Work and Helping Serv.	188.65	207.12	9.8	649,899.74	675,640.50	4.0	1
Anthropology	333.45	324.20	2.7-	224,303.78	329,062.00	46.7	2
Economics	299.20	320.32	7.1	250,729.23	169,255.20	32.4-	3
History	324.66	351.95	8.4	267,063.90	238,800.00	10.5-	3
Geography	340.37	383.18	12.6	191,626.87	167,065.50	12.7-	3
Political Science	331.15	256.51	13.4-	224,190.75	121,410.50	45.8-	4
Sociology	370.97	362.22	2.3-	300,607.08	241,965.00	19.4-	4
Statewide Average	288.37	304.71	5.7	397,772.36	358,160.77	10.0-	

The last column in Tables 4, 5 and 6 assign each field of study to a category based on the two percent change values. The educational and economic ramifications of these four different combinations of shifts in expenditure that have occurred between FY1976 and FY1981 may be interpreted by focusing on each category.

Category 1. These fields of study have experienced an increase in both unit costs and costs per program. Assuming a positive correlation between increased resources and improvements in educational quality, one would expect that programs in this category would be "educationally stronger" than they were five years ago. While these fields also show increases in unit costs, most are on the order of 10 percent or less Only seven programs in this category, across all levels, have had a greater than 25 percent increase in costs per credit hour during the period 1976 through 1981. Further, most of the programs in this category have experienced significant increases in student demand. In general, there would not be serious concerns for the number of programs that are offered in these fields of study statewide, nor for the level of resource support that universities have been able to allocate to them.

Category 2. These fields of study have experienced a decrease in unit costs while the level of expenditures per program has increased. These, in general, are fields of study that show substantial increases in student demand in recent years (i.e., computer science, economics and business administration) and universities have not been

able to reallocate resources at the same rate. Since resources have expanded in these fields of study, while unit cost declines have in most areas been less than five percent, there is little reason for concern about educational or economic justification at this level of analysis.

Category 3. These fields of study show an increase in unit costs at the same time that the level of resources available to support each program has declined. Most of the fields of study in this category have experienced decreases in student demand. And, as would be expected, universities have responded by reducing the resources available to these programs. In many cases, these resource reductions have been severe; particularly at the upper division and doctoral levels. Approximately three of every five programs in category '3' at the upper division and doctoral levels expended 25 percent fewer constant dollars per program in 1981 than in 1976. Eight program areas at the baccalaureate level, one program area at the masters level and two program areas at the doctoral level are supported by less than 40 percent of the resources per program statewide than was the case five years ago. Surely, resource reductions of this magnitude raise serious concerns for the continued educational viability, as well as for the appropriateness of the number of programs which are being offered statewide in these fields of study. Further concerns are raised upon examination of the increases in unit costs that have occurred in many of these same

program areas that have experienced significant resource reductions. In many cases universities have not found it feasible to offset increases in unit cost. Tables 4, 5 and 6 show that 11 program areas at the baccalaureate level, six at the masters level and four at the doctoral level have experienced reductions of greater than 10 percent in resources available per program and increases of greater than 10 percent in unit costs. The continued educational and economic justification of programs in these fields of study should be the object of close scrutiny in university and statewide program reviews.

Category 4. Fields of study in this category exhibited decreases in both unit costs and resources per program between 1976 and 1981. Most, but not all, of the program areas in category '4' have seen declines in student majors over the five year period. In some cases universities have undoubtedly concluded that reductions could be made without impairing quality, or that the resource mix was "too rich" in 1976 and needed to be adjusted. Many of the program areas falling into category '4' correspond with disciplines that support large undergraduate service loads for other majors.

Programmatic Adjustments

A natural outcome of a State level program review process in the reconsideration of an "appropriate" program mix. The demand for and resources allocated to various degree programs is one factor in such a reconsideration. Major decreases in credit hours in a given

field of study might suggest that fewer programs may be adequate to serve future student demand. On the other hand, major increases in student demand may indicate a need for additional degree programs.

Table 7, below, shows the net changes in program mix that have occurred between FY1976 and FY1981.

TABLE 7

NET ADDITIONS AND DELETIONS OF DEGREE PROGRAMS BY LEVEL ACROSS FIELDS OF STUDY, 1976-1981

	Bachelors	Masters	Doctoral
Additions of 2 or more programs	6 (12.5%)	10 (27.0%)	2 (7.4%)
Addition of 1 program	8 (16.7%)	5 (13.5%)	3 (11.1%)
No change in number of programs	26 (54.2%)	14 (37.9%)	20 (74.1%)
Deletions of 1 program	5 (10.4%)	4 (10.8%)	2 (7.4%)
Deletion of 2 or more programs	3 (6.2%)	4 (10.8%)	0 (0.0%)
Number of fields of study analyzed	48 (100.0%	37 (100.0%	27 (100.0%)

Table 7 shows that there have been no changes in the number of programs offered in 26 fields of study at the baccalaureate level, in 14 fields of study offered at the masters level and in 20 fields of study offered at the doctoral level. In the aggregate, across all levels, there has been no change in the number of degree programs in more than 50 percent of the fields of study offered statewide between 1976 and 1981.

Had institutions kept the level of resources per program constant between FY1976 and FY1981 through program deletion and addition, a very different summary would have resulted. For example, upper division German majors, on the average, generated costs of $66,892 per program in inflated 1976 dollars. In order to maintain that level of support per German program in 1981, the $292,911 generated by German majors should have been distributed across 4.4 programs rather than the seven programs offered. Such a calculation was done for each field of study in the three levels of instruction and the "expected" number of programs compared with the actual 1981 programs. Table 8 below summarizes the program changes that would have occurred if such a strategy had been followed.

TABLE 8

PROGRAM ADDITIONS AND DELETIONS NEEDED TO MAINTAIN A CONSTANT LEVEL OF SUPPORT PER PROGRAM

	Bachelors	Masters	Doctoral
Additions of 2 or more programs	11 (22.9%)	6 (16.2%)	0 (0.0%)
Additions of 1 program	2 (4.2%)	2 (5.4%)	4 (14.8%)
No change in the number of programs	6 (12.5%)	8 (21.6%)	12 (44.5%)
Deletions of 1 program	10 (20.8%)	13 (35.2%)	6 (22.2%)
Deletions of 2 or more programs	19 (39.6%)	8 (21.6%)	5 (18.5%)
Number of fields of study analysed	48 (100.0%)	37 (100.0%)	27 (100.0%)

The big difference between Tables 7 and 8 is in the number of fields that actually did reduce the number of programs and the number of fields that should have. According to Table 7, at the baccalaureate level eight fields of study deleted at least one program between 1976 and 1981. At the masters and doctoral level, the numbers were eight and two respectively. According to Table 8, however, if constant resources per program were to be maintained, at least 29 baccalaureate, 22 masters and 11 doctoral fields of study should have deleted at least one program each in the intervening five years.

Limitations

This study represents a first attempt to better understand the educational and economic ramifications of shifts in student demand from a state-level perspective. Several limitations in this analysis will be addressed in future refinements.

Beginning in FY1983, institutions will submit their discipline costs and credit hours at a greater level of disaggregation. In addition they will submit their induced workload matrices. This will allow the analysis to focus more closely on actual departmental expenditures and to analyze the extent to which changes in the service load of various fields of study accounts for shifts in demand.

The choice of FY1976 and FY1981 as beginning and ending points in the analysis was dictated by the limits of the historical data base. This analysis assumes that costs in FY1976 represented an

optimal distribution of resources and that all fields of study were similarly efficient or non-efficient prior to FY1976. Future analyses will use multiple year averages for beginning and ending points, making those assumptions safer.

Applying the criteria discussed earlier under "Units of Analysis" resulted in 30 to 50 percent of the statewide credit hours being excluded from the analysis. These criteria will have to be reexamined to ensure that all credit hours generated by all programs will be included in future analyses.

Conclusion

It should be reiterated that the data presented in this analysis are based on aggregations of data from individual programs. The analysis is intended primarily to point out those fields of study in which the individual programs should receive careful examination in the context of program review. Many other factors are considered in the course of reaching program review decisions.

Despite limitations, the approach described in this paper does provide a statewide analytical perspective on assessing the relative overcapacity or undercapacity in a field of study. The absence of such an analysis has made it more difficult in the past to make decisions about individual program review results from a statewide perspective. While in Illinois no program review decision will be made solely on the basis of the data generated by this analysis, it can also be said that in the future no program review decision will be likely made without first examining these data.

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